



# REPORT

545 E. Algonquin Rd., Arlington Heights, IL 60005

Project No. G102406056

Date: March 10, 2016

REPORT NO. 102406056CHI-001

TEST OF ONE AR111 LAMP

MODEL NO. SR111-12-08D-927-03

LED MODEL NO. SORAA

DRIVER MODEL NO. SORAA

RENDERED TO

SORAA

6500 KAISER DR. SUITE 110

FREMONT, CA 94555

TEST: Electrical and Photometric tests as required to the IESNA test standard.

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00660665.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI NEMA ANSLG C78.377: 2012: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number SR111-12-08D-927-03. The sample was received by Intertek on March 1, 2016, in undamaged condition and one sample was tested as received. The sample designation was AH03012016050546-1.

DATES OF TESTS: March 8, 2016 through March 10, 2016.

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SUMMARY

Model No.:	SR111-12-08D-927-03
Description:	AR111 Lamp

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	661.1	654.6
Total Power (W)	12.70	12.68
Luminaire Efficacy (LPW)	52.06	51.62

Criteria	Result
Power Factor	0.920
Current ATHD %	34.63
Correlated Color Temperature (CCT - K)	2706
Color Rendering Index (CRI - Ra)	94.9
Color Rendering Index (CRI - R9)	98.3
DUV	0.002
Chromaticity Coordinate (x)	0.457
Chromaticity Coordinate (y)	0.406
Chromaticity Coordinate (u')	0.262
Chromaticity Coordinate (v')	0.525

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Yokogawa Power Meter	WT210	146919	07/14/15	07/14/16	03/10/16
Omega Thermometer	DPI8-C24	146920	10/09/15	10/09/16	03/10/16
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	03/10/16
Newport Hygrometer	iServer	146956	01/04/16	01/04/17	03/10/16
Elgar, AC Power Supply	CW1251P	146918	VBU	VBU	03/10/16
2 Meter Sphere & Spectroradiometer	MS760/CDS11C	146137	VBU	VBU	03/08/16
Elgar AC Power Supply	CW1251M	146113	VBU	VBU	03/08/16
Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU	03/08/16
Newport Humidity Recorder	iTHX-SD	146382	07/09/15	07/09/16	03/08/16
Yokogawa Power Meter	WT1600	146770	04/07/15	04/07/16	03/08/16
Omega Temperature Meter	MDSi8	146873	07/09/15	07/09/16	03/08/16



## TEST METHODS

### Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

### Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model CDS 1100 CCD Array Spectroradiometer and Two Meter or Ten Foot Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

### Photometric and Electrical Measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

**RESULTS OF TEST**

**Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method**

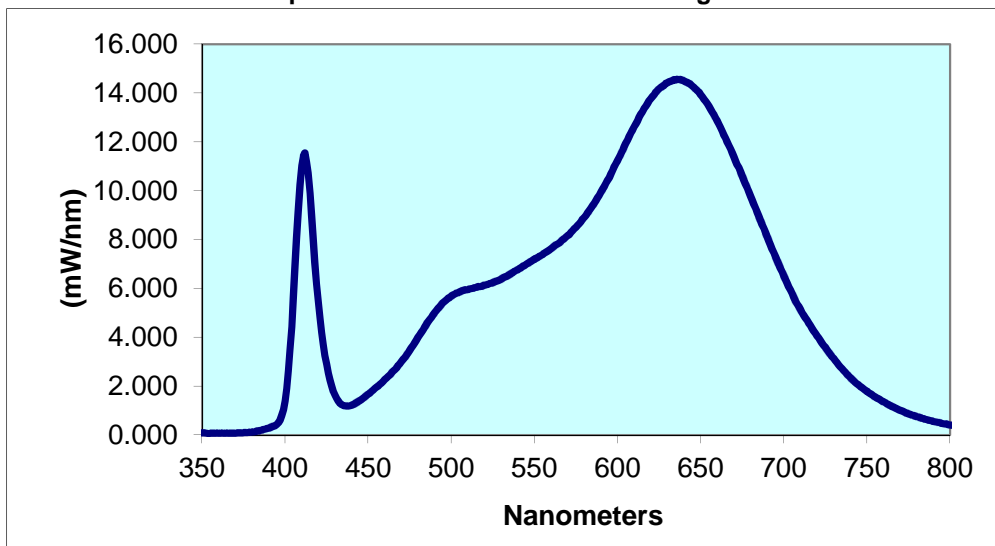
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Input Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH03012016050546-1	Up	12.0	1152	12.70	0.920	34.63	661.1	52.06

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
2706	94.9	98.3	0.002	0.457	0.406	0.262	0.525

**Spectral Distribution over Visible Wavelengths**

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.075	440	1.222	530	6.387	620	13.76	710	5.138
355	0.071	445	1.404	535	6.563	625	14.17	715	4.582
360	0.074	450	1.666	540	6.766	630	14.42	720	4.058
365	0.079	455	1.956	545	6.986	635	14.54	725	3.576
370	0.074	460	2.265	550	7.194	640	14.49	730	3.128
375	0.090	465	2.610	555	7.399	645	14.29	735	2.719
380	0.115	470	3.001	560	7.630	650	13.94	740	2.351
385	0.179	475	3.463	565	7.872	655	13.46	745	2.041
390	0.276	480	3.995	570	8.161	660	12.86	750	1.790
395	0.429	485	4.523	575	8.504	665	12.15	755	1.562
400	1.396	490	5.005	580	8.916	670	11.40	760	1.361
405	5.623	495	5.418	585	9.396	675	10.60	765	1.173
410	11.03	500	5.684	590	9.952	680	9.781	770	1.011
415	9.897	505	5.867	595	10.55	685	8.952	775	0.872
420	5.410	510	5.950	600	11.22	690	8.108	780	0.749
425	2.882	515	6.043	605	11.93	695	7.302		
430	1.629	520	6.130	610	12.61	700	6.532		
435	1.210	525	6.240	615	13.23	705	5.791		

**Spectral Data Over Visible Wavelengths**



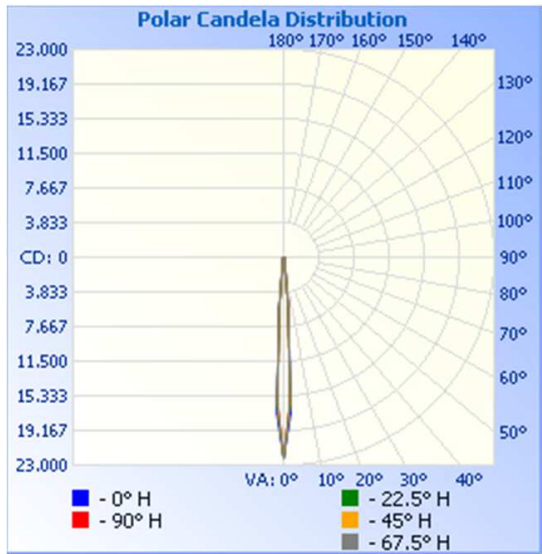
**RESULTS OF TEST (cont'd)**

**Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method**

Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH03012016050546-1	Up	12.1	1140	12.68	0.920	654.6	51.62

**Intensity (Candlepower) Summary at 25°C - Candelas**

Angle	0	22.5	45	67.5	90
0	22199	22199	22199	22199	22199
5	5676	5429	5460	5604	5604
10	633	601	557	528	527
15	322	306	291	280	282
20	178	173	163	157	154
25	113	112	108	105	103
30	92	93	91	88	88
35	71	71	71	67	71
40	53	55	56	54	59
45	29	29	30	29	29
50	19	19	20	20	19
55	15	16	16	16	16
60	12	13	13	13	13
65	10	11	11	11	11
70	8	9	9	9	9
75	7	7	7	7	7
80	5	6	6	5	5
85	2	3	3	3	3
90	1	1	2	2	1

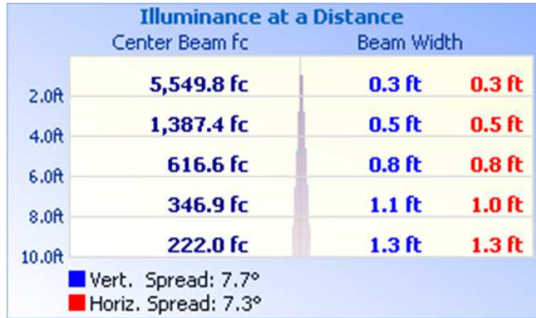


RESULTS OF TEST (cont'd)

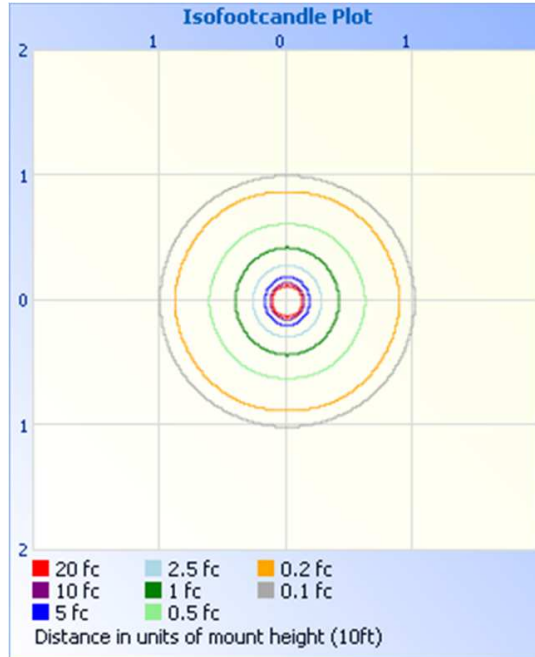
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	549.8	84.0
0-40	594.0	90.7
0-60	632.8	96.7
60-90	21.6	3.3
0-90	654.4	100.0
90-180	0.2	0.0
0-180	654.6	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	414.3	63.3
10-20	83.4	12.7
20-30	52.1	8.0
30-40	44.2	6.7
40-50	24.7	3.8
50-60	14.1	2.2
60-70	10.7	1.6
70-80	7.5	1.1
80-90	3.4	0.5
90-100	0.2	0.0

PICTURES (not to scale)



CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:



Timothy Quigley  
Engineer  
Lighting Division

Attachment: None

Report Reviewed By:



Kenda Branch  
Team Lead  
Lighting Division